SUB H2 cont F2 cont.

polymers thermally bonded to the outer wall surface of said joined pipe lengths at a predetermined spatial angle with respect thereto for maximum effectiveness in withstanding applied internal stress when the reinforced pipe lengths are subsequently put into service, the continuous fibers having been continuously applied in an unbonded condition while maintaining the joined pipe lengths in their hollow condition and the subsequent thermal bonding of the applied fibers primarily adhering the applied fibers to the outer wall surface of the underlying pipe lengths without utilizing further adherence agents.

REMARKS

All above amended claims 1-10 respectfully are deemed to patently distinguish the now claimed article in a structural manner from the single Gibson et al reference being relied upon for rejection by the Examiner. Antecedent basis for a first structural distinction now recited in said amended claims can be found on pages 3-4 of the applicant's specification where the spatial angle of the applied fibers is said to provide "maximum effectiveness in withstanding applied stress when the pipe member is in service". Likewise, such antecedent basis for a remaining structural distinction now recited in said amended claims can be found on page 8 and elsewhere in the applicant's specification where it is pointed out that thermal bonding of the applied fibers to the underlying pipe length limits adherence of said fibers to "the outer pipe surface".

Claims 1-6 in the present application stand rejected as regarded by the Examiner to be anticipated under 35USC102(b) or obvious under 35USC103(a) based on the single Gibson et al reference (Reg,No.H1261). The present applicant cannot agree with both of said conclusions reached by the Examiner for several critical reasons. First of all, there is entirely insufficient recognition in said reference that the spatial angle at which the reinforcement fibers are being applied to a thermoplastic pipe member will govern effectiveness when the reinforced pipe member is subsequently put into service. As recognized by the present applicant on the previously pointed out pages 3-4 in the specification, there is needed to be significantly different spatial angles for the applied reinforcement fibers for "maximum effectiveness" in service which depends upon such factors as

above ground or below ground pipe installations. As distinct therefrom, the only mention appearing in Gibson et al regarding fiber placement angles calls for "alternate layers of hoop and helical patterns" (see column 5, lines 56-57 in said reference) which simply does not conform to the structural requirements for the applied fibers which are now recited in the rejected claims. Moreover, the Gibson et al process for fabrication of a single thermoplastic pipe member requires employment of a heated mandrel 16 supporting the pipe member throughout fiber reinforcement processing. The present claims further recite "maintaining said pipe length in its hollow condition during processing to facilitate far greater ease when processing both single and multiple pipe lengths all in a continuous manner.

A still further structural distinction for the now claimed fiber reinforced thermoplastic pipe member and members pertains to consolidation of the applied fibers to the underlying pipe members. Gibson et al requires the underlying "thermoplastic material" itself to be heated to a "trixotropic molten state" when the reinforcement fiber is being applied. Such fabrication of the composite article produces embedment of the reinforcement fibers in the underlying thermoplastic material with serious difficulties arising from such method of fiber reinforcement. Wall thickness and pipe diameter variations far more likely to occur in the composite article being formed in accordance with the Gibson et al method of preparation. Likewise, control of temperature variation in the Gibson et al method of fabrication whereby the applied fiber becomes embedded in the molten underlying thermoplastic material promotes still further processing difficulties attributed to different softening temperatures for the individual thermoplastic materials being employed. The now claimed fiber reinforced thermoplastic pipe member or members does not experience comparable difficulties due to a dissimilar method of fabrication. In the present method of fabrication the reinforcement fibers can be applied to the outer pipe surface at ambient temperatures with subsequent processing of the applied fiber only thermally securing the fiber to the "outer wall surface" of the underlying pipe length as now recited in all amended claims. A significant structural distinction thereby exists between embedded fiber reinforcement in the Gibson et al article and outer surface

fiber bonding in the now claimed article. Such further structural distinction recited in the now amended claims should not be regarded as simply obvious from a reference failing to suggest means for an equivalent product construction.

Remaining claims 7-10 in the present applicant stand rejected under 35USC103 as regarded by the Examiner to be unpatentable over this same reference. The applicant respectfully cannot agree with such conclusion by the Examiner in view of the above noted structural distinctions also recited in said remaining claims. A need for mandrel support of the thermoplastic pipe length in Gibson et al which persists throughout the entire fiber reinforcement process is eliminated with the now claimed improvement. In forming a structural dissimilar fiber reinforced article, Gibson et al heats the underlying thermoplastic material to a molten condition in order to push the applied fibers into said molten mass (see column 3, lines 54-61 in said reference). External pressure on the applied fibers is also said to be required in Gibson et al for a "successful" fiber embedment to be achieved (see column 4, lines 27-30 in said reference). By having the applied fibers simply adhered to the "outer wall surface" of a hollow thermoplastic pipe member or members in the now claimed construction, a substantial structural distinction is understandably found to exist. Likewise, preserving the fiber reinforcement at a predetermined spatial angle for "maximum effectiveness" is far better maintained in the now claimed construction than can be expected for the Gibson et al's type of construction.

The Examiner is respectfully deemed to have overlooked the above noted structural distinctions for the now claimed improvement which both facilitate fabrication of the now claimed plurality of reinforced pipe lengths. First of all, there is entirely no obvious suggestion in Gibson et al for the reinforcement of "thermoplastic pipe lengths prejoined together at the ends" as recited in the now amended claims. The reference only discloses reinforcement of a single member constructed in a dissimilar manner than now claimed. Gibson et al's fiber reinforcement of a single article would only suggest to one skilled in the art that the reinforced article be joined with other like reinforced articles after mandrel removal. As dissimilar therefrom, the now claimed

construction requires already joined together "hollow" pipe lengths to be fiber reinforced in a continuous manner not requiring mandrel support. It can only be concluded therefrom that the Examiner relies on unpermitted hindsight of the applicant's own teachings for support of the rejection now being considered. To properly apply such obvious rejection, there must be found obvious suggestion of the presently claimed multiple pipe construction in the reference itself as distinct from reinforcing only a single pipe member which has a structurally dissimilar type construction.

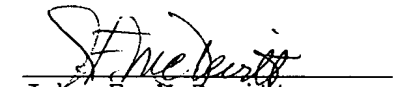
A desirably lower stress condition in the now claimed fiber reinforced pipe member is also attributable to the present method of fabrication when compared to Gibson et al's final product. The reference employs a hot winding process when the fibers are being applied. The present method does not apply heat during the winding process as recited in all amended claims. The Gibson et al method, however, melts the underlying thermoplastic liner to the fiber prepreg during the winding process which creates thermal stress since the fiber is only being selectively heated. In the present method, the thermoplastic liner remains unheated to minimize such localized stress by winding without heat. Only the outside of the fiber wrapped structure is heated in the present method with such post heating allowing thermal expansion of the underlying liner to apply compaction pressure along the entire circumference to equalize stress between the components being joined together. In so doing, a lower stress condition in the now claimed final product imparts improved strength when put into service. Since the present method of fabrication does not heat the thermoplastic liner to its melt temperature, it also now become possible to continuously fabricate multiple lengths of reinforced pipe as further recited in the present claims.

In summary, it is believed that all now amended claims 1-10 in the present application specify patentable subject matter and are in condition for allowance. The applicant thereby respectfully requests an early favorable reconsideration and allowance of the application. In doing so, the Examiner is respectfully requested to give consideration to the foregoing summarized structural distinctions noted between the Gibson et al final product and the now claimed final product when considered together with

the many advantages attributable to a simpler means of construction for said now claimed article. If there are any outstanding issues which might be resolved by consulting with the undersigned attorney, the Examiner is invited to call said attorney at the telephone number given below.

A marked up copy of the amended claims accompanies this amendment on a separate page.

Respectfully submitted,



John F. McDevitt
Patent Attorney
Reg. No. 19,140

2255 Par Lane #626
Willoughby Hills, OH 44094
440/585-0919
May 6, 2002

CERTIFICATE OF MAILING

I HEREBY CERTIFY that this Amendment A is being deposited in an envelope with the Postal Service addressed to: COMMISSIONER OF PATENTS AND TRADEMARKS on this 6th day of May 2002.

John F. McDevitt

APPENDIX

1. (Twice Amended)A fiber reinforced pipe length comprising a solid thermoplastic organic polymer having an outer wall enclosing a inner hollow cavity which includes a plurality of continuous juxtapositioned reinforcement fibers formed with a solid material composition selected from the group consisting of ceramics, metals, carbon, glass compositions and organic polymers thermally bonded to the outer wall surface at a predetermined spatial angle with respect thereto[,] for maximum effectiveness in withstanding applied internal stress when the reinforced pipe length is subsequently into service, the continuous fibers having been continuously applied in an unbonded condition while maintaining said pipe length in its hollow condition and the subsequent thermal bonding of the applied fibers primarily adhering the applied fibers to the outer wall surface of the underlying pipe length [not] without utilizing further adherence agents.

7. (Twice Amended)A plurality of identical fiber reinforced pipe lengths joined together at the ends prior to reinforcement and each comprises a solid thermoplastic organic polymer member having an outer wall enclosing an inner hollow cavity, said joined pipe lengths having a plurality of continuous juxtapositioned reinforcement fibers formed with a solid material composition selected from the group consisting of ceramics, metals, carbon, glass compositions and organic polymers thermally bonded to the outer wall surface of said joined pipe lengths at a predetermined spatial angle with respect thereto for maximum effectiveness in withstanding applied internal stress when the reinforced pipe lengths are subsequently put into service, the continuous fibers having been continuously applied in an unbonded condition while maintaining the joined pipe lengths in their hollow condition and the subsequent thermal bonding of the applied fibers primarily adhering the applied fibers to the outer wall surface of the underlying pipe lengths [with] without utilizing further adherence agents.